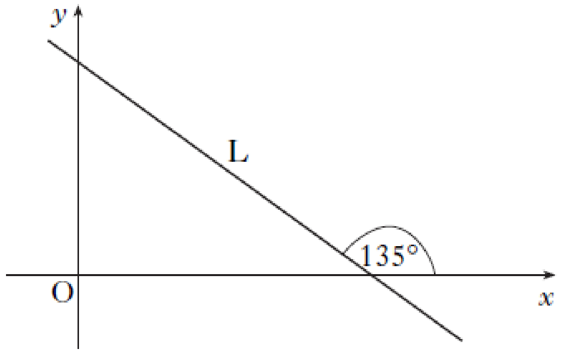
00 PI A3	**3C** $\bullet^1$ $\frac{2-(-1)}{3\sqrt{3}-0}$ $\bullet^2$ $\tan a = \text{gradient}$ ***stated or implied by*** $\bullet^3$ $\bullet^3$ $a = 30$
01 PI Q1	**3C** $\bullet^1$ $y = -\frac{2}{3}x + \frac{5}{3}$ stated $\bullet^2$ $m_{line} = -\frac{2}{3}$ stated $\bullet^3$ $y-(-1) = -\frac{2}{3}(x-2)$ ans: $2x+3y=1$
3. (JAN) 02 P1	**2C, 2C** $\bullet^1$ $m = -1$ $\bullet^2$ $y-5 = -1(x+1)$ **or** $y-1 = -1(x-3)$ ans: $y+x=4$ $\bullet^3$ $\tan(\text{angle}) = -1$ $\bullet^4$ $\text{angle} = 135°$
4.(JAN) 02 P2	**6C, 2C** $\bullet^1$ $m_{PR} = 2$ stated $\bullet^2$ *use* $m_1 m_2 = -1 \Rightarrow m_{QS} = -\frac{1}{2}$ $\bullet^3$ $y-4 = -\frac{1}{2}(x+2)$ $\bullet^4$ $2y+x=6$ or equivalent $\bullet^5$ strategy for sim. equ eg substitute $\bullet^6$ $T(2,2)$ OR $\bullet^7$ *strategy eg* $\vec{TP} = \vec{RT}$ $\bullet^7$ $x_P = -1$ $\bullet^8$ $P(-1,-4)$ $\bullet^8$ $y_P = -4$
	3C, 4C, 1C $\bullet^1$ $F = \text{mid}_{AB} = (-2,2)$ $\bullet^2$ $m_{FC} = 0$ stated or implied by $\bullet^3$ $\bullet^3$ equ FC is $y = 2$ $\bullet^4$ $M = \text{mid}_{BC} = (1,0)$ $\bullet^5$ $m_{BC} = \frac{1}{2}$ $\bullet^6$ $m_{\perp} = -2$ ans : $y = 2$ $\bullet^7$ $y-0 = -2(x-1)$ ans : $y = -2x + 2$ $\bullet^8$ $(0,2)$ ans : $(0, 2)$
03 P1	**3C** $\bullet^1$ $m = -4$ stated or implied by $\bullet^2$ $\bullet^2$ $m_{perp} = \frac{1}{4}$ $\bullet^3$ $y-3 = \frac{1}{4}(x-(-1))$ ans: $x-4y+13=0$

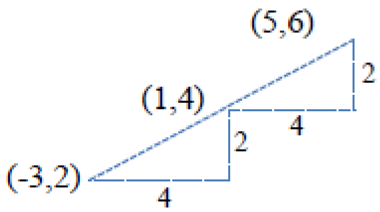
04 P1	**3C, 5C** $\bullet^1$ $x=-3y-1$ *and attempt to substitute* *e.g.* $2(-3y-1)+.....=0$ $\bullet^2$ $B(5,-2)$ $\bullet^3$ $m_{AB}=3$ $\bullet^4$ $m_{AB}=3 \Rightarrow m_{perp}=-\frac{1}{3}$ $\bullet^5$ $y=-\frac{1}{3}x.....$ *stated / implied by* $\bullet^6$ $\bullet^6$ $m_{l_1}=-\frac{1}{3}$ $\bullet^7$ $m_{l_2}=-\frac{2}{5}$ $\bullet^8$ so only the 1st line is perpendicular to AB **OR** $\bullet^4$ $y=-\frac{1}{3}x...$ may be implied by $\bullet^5$ $\bullet^5$ $m_{l_1}=-\frac{1}{3}$ $\bullet^6$ $m_{l_2}=-\frac{2}{5}$ $\bullet^7$ $l_1: 3\times-\frac{1}{3}=-1$ *so* $AB\perp l_1$ $\bullet^8$ *and* AB *is not* $\perp l_2$ **OR** $\bullet^4$ $m_{AB}=3 \Rightarrow m_{perp}=-\frac{1}{3}$ $\bullet^5$ $y=-\frac{2}{5}x$ *stated / implied by* $\bullet^6$ $\bullet^6$ $m_{l_1}=-\frac{2}{5}$ $\bullet^7$ $m_{l_2}=-\frac{1}{3}$ $\bullet^8$ so only the 2nd line is perpendicular to AB **OR** $\bullet^4$ $m_{perp}=-\frac{1}{3}$ $\bullet^5$ strat: find equ. thr' B with gradient $-\frac{1}{3}$ $\bullet^6$ $y-(-2)=-\frac{1}{3}(x-5)$ $\bullet^7$ *leading to* $3y+x+1=0$ $\bullet^8$ the first line is the ONLY line perp. to AB **OR** $\bullet^4$ $y=-\frac{1}{3}x...$ may be implied by $\bullet^5$ $\bullet^5$ $m_{l_1}=-\frac{1}{3}$ $\bullet^6$ $m_{l_2}=-\frac{2}{5}$ $\bullet^7$ $l_1: 3\times-\frac{1}{3}=-1$ *so* AB *is the* **ONLY** *line* $\perp l_1$ $\bullet^8$ *implied by the* "**ONLY**" *at* $\bullet^7$.
04 P2	**3C, 1C** $\bullet^1$ $\text{gradient}=\frac{1}{2}$ $\bullet^2$ $\tan a^\circ=\text{gradient}$ stated $\bullet^3$ $\tan^{-1}\left(\frac{1}{2}\right)=26.6^\circ$

	$\bullet^4$ $m_{l_2} = \tan(30+26.6)^\circ = 1\cdot 5$ • $m_{OA} = ½$ • tan a° = ½ • a = $\tan^{-1}$(½) = 26.6° • m_{OB} = tan (30 + 26.6)° = 1.5
05 P1	**3C** $\bullet^1$ $m = \tan(60^\circ)$ **stated** $\bullet^2$ $m = \sqrt{3}$ $\bullet^3$ $y - 0 = \sqrt{3}(x-(-2))$
06 P1	**3C, 3C, 3C** $\bullet^1$ $D = (3,5)$ $\bullet^2$ $m_{BD} = 2$ $\bullet^3$ $y-5 = 2(x-3)$ *or* $y+5 = 2(x-(-2))$ *etc* $\bullet^4$ $m_{BC} = \frac{1}{3}$ **stated explicitly** $\bullet^5$ $m_{alt} = -3$ $\bullet^6$ $y-12 = -3(x-(-1))$ $\bullet^7$ $y-5 = 2(x-3)$ ***and*** $y-12 = -3(x-(-1))$ **or equivalent** $\bullet^8$ $x = 2$ $\bullet^9$ $y = 3$
06 P2	**4C, 2C** $\bullet^1$ $m_{PS} = 3$ $\bullet^2$ $m_{QS} = -\dfrac{1}{3}$ $\bullet^3$ $y-6 = -\frac{1}{3}(x-4)$ To gain $\bullet^4$, some evidence of completion needs to be shown $\bullet^4$ completes proof e.g. $y-6 = -\frac{1}{3}(x-4)$ $\bullet^5$ $Q = (22,0)$ $3(y-6) = -(x-4)$ $\bullet^6$ $R = (24,6)$ $x+3y = 22$
07 P1	**3C** $\bullet^1$ $y = 3x....$ stated/implied by $\bullet^2$ $\bullet^2$ $gradient = 3$ stated/implied by $\bullet^3$ $\bullet^3$ $y-4 = 3(x-(-1))$ *or* $\bullet^1$ *form is* $3x - y + c = 0$ $\bullet^2$ $3\times(-1) - 4 + c = 0$ $\bullet^3$ $c = 7$

08 P1	**7.** The diagram shows a line L; the angle between L and the positive direction of the x-axis is 135°, as shown.  What is the gradient of line L?
08 P2	**4C, 3C, 3C** •[1] $m_{BC} = -\frac{1}{2}$ *stated explicitly* •[2] $m_{\perp} = 2$ *stated / implied by* •[4] •[3] midpoint of BC = $(1, -3)$ •[4] $y + 3 = 2(x - 1)$ and complete •[5] midpoint of AB = $(2,4)$ •[6] $m_{median} = -3$ •[7] $y + 5 = -3(x - 5)$ *or* $y - 4 = -3(x - 2)$ •[8] use $y = 2x - 5$ $y = -3x + 10$ •[9] $x = 3$ •[10] $y = 1$
09 P1	**1C, 3C, 4C** •[1] $P = (-3, 0)$ •[2] $m_{QR} = -2$ **or equivalent** •[3] $m_{alt} = \frac{1}{2}$ **s / i by** •[4] •[4] $alt: y - 0 = \frac{1}{2}(x + 3)$ •[5] $QR: y + 2 = -2(x - 8)$ ***or*** $y - 6 = -2(x - 4)$ •[6] $e.g.\ x - 2y = -3$ *and* $2x + y = 14$ see Note 5 & Options •[7] $x = 5$ •[8] $y = 4$

	Option 1 for $\bullet^5$ *to* $\bullet^8$:	$\bullet^5$ $QR: y+2=-2(x-8)$ $\bullet^6$ $\frac{1}{2}(x+3)=-2(x-8)-2$ $\bullet^7$ $x=5$ $\bullet^8$ $y=4$
	Option 2 for $\bullet^5$ *to* $\bullet^8$:	$\bullet^5$ $QR: y-6=-2(x-4)$ $\bullet^6$ $\frac{1}{2}(x+3)=-2(x-4)+6$ $\bullet^7$ $x=5$ $\bullet^8$ $y=4$
10 P1	know and find midpoint of AC calculate gradient of BQ state equation	$\bullet^1$ (11, 10) $\bullet^2$ $-\frac{6}{15}$ or equivalent $\bullet^3$ $y-16=-\frac{2}{5}(x-(-4))$ **or** $y-10=-\frac{2}{5}(x-11)$
	substitute in for T	$\bullet^4$ e.g. Substitution : $2(6)+5(12)=12+60=72$ Gradients : $m_{BT}=-\frac{4}{10}=-\frac{2}{5}=m_{BQ}$ Vectors : $\overrightarrow{BT}=\begin{pmatrix}10\\-4\end{pmatrix}$, $\overrightarrow{TQ}=\begin{pmatrix}5\\-2\end{pmatrix}$ and $\overrightarrow{BT}=2\overrightarrow{TQ}$
		Method 1 : Vector approach
	valid method for finding the ratio complete to simplified ratio	$\bullet^5$ e.g. $\overrightarrow{BT}=\begin{pmatrix}10\\-4\end{pmatrix}$ and $\overrightarrow{TQ}=\begin{pmatrix}5\\-2\end{pmatrix}$ $\bullet^6$ $2:1$
		Method 2 : "Stepping out" approach $\bullet^5$ e.g. B ——10—— T ——5—— Q or B −4, T 6, Q 11; 10, 5 $\bullet^6$ $2:1$
		Method 3 : Distance Formula approach $\bullet^5$ e.g. $d_{BT}=\sqrt{116}$ and $d_{TQ}=\sqrt{29}$ $\bullet^6$ $2:1$
11 P1	find gradient of BD state equation of BD	$\bullet^1$ $\frac{15}{5}$ or equivalent $\bullet^2$ $y-(-3)=3(x-2)$ **or** $y-12=3(x-7)$

	start solution of simultaneous equations	•3 e.g. $3x-y=9$ and $x+3y=23$ **or** $3x-9=-\frac{x}{3}+\frac{23}{3}$ **or** $x+3(3x-9)=23$
	solve for one variable	•4 $x=5$ **or** $y=6$
	solve for second variable	•5 $y=6$ **or** $x=5$
	know and find midpoint of AB	•6 $(3,10)$
	find gradient of AB	•7 $\frac{4}{8}$ or equivalent
	interpret perpendicular gradient	•8 $-\frac{8}{4}$ or equivalent **stated, or implied**
	state equation of perp. bisector	•9 $y-10=-2(x-3)$ **but not** $y-6=-2(x-5)$
	justification of point on line	•10 when $x=5,\ y=-2\times5+16=6$ **or** $2\times5+6-16=0$
12 P1	find midpoint of PQ	•1 (1, 3)
	find gradient of PQ	•2 -3
	interpret perpendicular gradient	•3 $\frac{1}{3}$
	state equation of perp. bisector	•4 $y-3=\frac{1}{3}(x-1)$
	use parallel gradients	•5 -3 **stated, or implied**
	state equation of line	•6 $y-(-2)=-3(x-1)$
	use valid approach	•7 e.g. $x-3y=-8$ **and** $9x+3y=3$ **or** $-3x+1=\frac{1}{3}x+\frac{8}{3}$ **or** $3(3y-8)+y=1$
	solve for one variable	•8 e.g. $x=-\frac{1}{2}$
	solve for other variable	•9 e.g. $y=\frac{5}{2}$
	identify appropriate points	•10 (1, 3) and $\left(-\frac{1}{2},\frac{5}{2}\right)$
	calculate distance	•11 $\sqrt{\frac{5}{2}}$ accept $\frac{\sqrt{10}}{2}$ or $\sqrt{2\cdot5}$
13 P2	know to find gradient	•1 $m_{PQ}=-2$
	use perpendicular gradient	•2 $m_{QR}=\frac{1}{2}$
	state equation of line	•3 $y-6=\frac{1}{2}(x-5)$
	prepare to solve	•4 $x+3y=13$ **and** $x-2y=-7$
	solve for one variable	•5 $x=1$ **or** $y=4$
	solve for second variable	•6 $y=4$ **or** $x=1$

	valid method eg vectors or stepping out or mid-point formula	•7 eg $\overrightarrow{QT} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$
	know how to find R	•8 R$(-3, 2)$
	know how to find S using $\overrightarrow{RS} = \overrightarrow{QP} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$	•9 S$(-1, -2)$
	Notes If R$(-3,2)$ and S$(-1,-2)$ appear without working then •7, •8 and •9 are not available. **Eg**  **OR** •7 $\frac{a+5}{2} = 1$; •8 $\frac{b+6}{2} = 4$ $a = -3$ •7 ; $b = 2$ •8	
14 P2	find gradient of AB	•1 $m_{AB} = 1$
	find perpendicular gradient	•2 $m_{perp} = -1$ stated or implied by •4
	find midpoint of AB	•3 $(4,1)$ stated or implied by •4
	obtain equation	•4 $y-1 = -1(x-4)$
	know to solve simultaneously	•5 $y+2x=6$ $y+x=5$
	solve correctly for x and y	•6 $x=1,\ y=4$
	know and use $m = \tan\theta$	•7 $\tan\theta = -2$
	calculate angle	•8 $116 \cdot 6°$ accept 117^0 or $2\cdot 03$ radians
	know and find midpoint of AC	•1 (11, 10)
	calculate gradient of BQ	•2 $-\frac{6}{15}$ or equivalent
	state equation	•3 $y-16 = -\frac{2}{5}(x-(-4))$ **or** $y-10 = -\frac{2}{5}(x-11)$
	substitute in for T	•4 e.g. Substitution : $2(6)+5(12) = 12+60 = 72$ Gradients : $m_{BT} = -\frac{4}{10} = -\frac{2}{5} = m_{BQ}$ Vectors : $\overrightarrow{BT} = \begin{pmatrix} 10 \\ -4 \end{pmatrix}$, $\overrightarrow{TQ} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$ and $\overrightarrow{BT} = 2\overrightarrow{TQ}$

		Method 1 : Vector approach
	valid method for finding the ratio	•[5] e.g. $\overrightarrow{BT}=\begin{pmatrix}10\\-4\end{pmatrix}$ and $\overrightarrow{TQ}=\begin{pmatrix}5\\-2\end{pmatrix}$
	complete to simplified ratio	•[6] 2 : 1
		Method 2 : "Stepping out" approach
		•[5] e.g. B —10— T —5— Q or B, T, Q: −4, 6, 11; 10, 5
		•[6] 2 : 1
		Method 3 : Distance Formula approach
		•[5] e.g. $d_{BT}=\sqrt{116}$ and $d_{TQ}=\sqrt{29}$
		•[6] 2 : 1

ANSWERS - PRE 2000 - **Concurrency**

1	•[1] know to solve 2 equ & check in 3rd •[2] 1 coord. of (5,-2) *or* $(\frac{14}{3},-\frac{16}{9})$ *or* $(\frac{41}{8},\frac{-13}{8})$ •[3] second appropriate coordinate •[4] checking (5,−2) does not lie on 3rd line *or* $(\frac{14}{3},-\frac{16}{9})$ not on 2nd line *or* $(\frac{41}{8},\frac{-13}{8})$ not on 1st line

ANSWERS - PRE 2000 - **Gradient (m = tan Θ)**

1	•[1] $m_{AB}=\frac{4b^2-a^2}{2b-a}$ •[2] $m_{AB}=\frac{(2b+a)(2b-a)}{2b-a}=2b+a$
2	•[1] $\tan a°=2$ •[2] $a=63.4°$ •[3] $\tan(180-b)=1$ •[4] $b=135$ •[5] $180-a-(180-b)$ or equiv. to $b-a$
3	•[1] "correct angle" $=\frac{\pi}{2}-\frac{\pi}{3}$ •[2] $\frac{1}{\sqrt{3}}$
4	•[1] *strat*: i.e. try to evaluate $C\hat{O}A$ •[2] $A\hat{O}B=36.9°$ •[3] $\tan 73.7°=3.428$
5	▪ OB = 5 •[3] $B\hat{O}X=36\cdot9°$ •[4] $R\hat{O}B=67\cdot4°$ •[1] *know to find* $\tan R\hat{O}X$ = 104° •[5] $m_{RO}=-3\cdot9$

ANSWERS - PRE 2000 **Collinearity**

1	•1 strat: *compare* gradients •2 $m_{A_1A_2}=\frac{2}{3}$ •3 $m_{A_2S}=\frac{1}{2}$ *or* $m_{A_1S}=\frac{5}{9}$ so not heading for S •4 $m_{B_1B_2}=\frac{5}{4}$ •5 $m_{B_2S}=\frac{5}{4}$ *or* $m_{B_1S}=\frac{5}{4}$ so heading for S	•1 strat: st lines and substitution •2 A_1A_2: $y+1=\frac{2}{3}(x+4)$ or equivalent •3 $4+1\neq\frac{2}{3}(5+4)$ so not heading for S •4 B_1B_2: $y+11=\frac{5}{4}(x+7)$ or equivalent •5 $4+11=\frac{5}{4}(5+7)$ so heading for S

ANSWERS - PRE 2000 **Parallel and Perpendicular Lines**

1	•1 $m=-\frac{3}{2}$ stated or implied by •2 •2 $y-(-5)=-\frac{3}{2}(x-3)$ ans: 3x + 2y + 1 = 0
2	•1 $m_{OA}=-\frac{3}{2}$ •2 $m_{\perp}=\frac{2}{3}$ •3 $y-3=\frac{2}{3}(x+2)$ eqn: 2x – 3y + 13 = 0 • 2(-5) – 3(1) + 13 = – 10 – 3 + 13 = 0, so (-5, 1) lies on this line and Brenda is standing on Newport Road.
3	(*a*) •1 $m_{PR}=2$ •2 PR: *e.g.* $y+2=2(x-1)$ •3 knowing to use $m_1m_2=1$ for m_{QS} •4 $m_{QS}=-\frac{1}{2}$ •5 QS: *e.g.* $y-3=-\frac{1}{2}(x-6)$ •6 knowing to solve simultaneously •7 $S=(4,4)$ (*b*) •8 $\vec{QM}=\vec{MS}$ or equivalent indication •9 $S=(2,5)$
4	**(*a*)** •1 using $m_1m_2=-1$ •2 $m_{AD}=-2$ •3 $y-4=-2(x-3)$ **(*b*)** •4 strategy for sim. equations •5 $2x+y=10$ or equiv •6 $(4,2)$ **(*c*)** •7 strategy : find length of AD •8 5

ANSWERS - PRE 2000 **Perpendicular Bisectors**

1	•1 $m_{AB} = \frac{3}{4}$ •2 $y - 5 = \frac{3}{4}(x - 5)$ or $y - (-1) = \frac{3}{4}(x - (-3))$ **ans : 3x – 4y + 5 = 0** •3 $m_{\perp} = -\frac{4}{3}$ •4 midpoint $= (1,2)$ •5 $y - 2 = -\frac{4}{3}(x - 1)$ **ans: 4x + 3y – 10 = 0**
2	•1 midpt $= (1,1)$ •2 $m_{AB} = -\frac{2}{3}$ •3 $m_{diam} = \frac{3}{2}$ •4 $y - 1 = \frac{3}{2}(x - 1)$
3	•1 midpoint $= (5,1)$ •2 $m_{AB} = \frac{2}{3}$ •3 $m_{\perp} = -\frac{3}{2}$ •4 $y - 1 = -\frac{3}{2}(x - 5)$ **ans: 3x + 2y – 17 = 0**
4	(a) •1 $m_{BC} = -\frac{1}{3}$ •2 $m_{\perp} = 3$ •3 $\text{midpoint}_{BC} = \left(\frac{9}{2}, \frac{5}{2}\right)$ •4 $y - \frac{5}{2} = 3\left(x - \frac{9}{2}\right)$ **ans: 3x – y – 11 = 0** **(b)** •6 perp. bisector passes thr' centre stated explicitly •7 using $y - 3x = -11$ and $y + 2x = 4$ **or equivalent equations** •8 $(3,-2)$
5	2C, 2C • $m_{AB} = -1$ • $x + y - 4 = 0$ $y - 5 = -1(x + 1)$ or $y - 1 = -1(x - 3)$ • tan (angle) = -1 • angle = 135° • AB = √((7 – -1)2 + (-3 – 5)2) = √(128) • AB = 8√2 (= 11.3) • $m_{perp} = 1$ (& A(-1, 5)) • $x - y + 6 = 0$ • M_{AB} (3, 1) (& m = 1) • $x - y - 2 = 0$

ANSWERS - PRE 2000 **Lines in Triangles**

1	ans: 4x + 3y – 1 = 0 •1 $D=(1,\ -1)$ •2 use A and D to get $m_{AD}=-\frac{4}{3}$ •3 $y-3=-\frac{4}{3}(x--2)$
2	ans: 2x – y – 5 = 0 •1 $M=(2,-1)$ •2 $m_{AM}=2$ •3 $y-(-1)=2(x-2)$
3	ans: 2x + y + 3 = 0 •1 $m_{QR}=\frac{1}{2}$ •2 $m_{PN}=-2$ • PS : y – 5 = –2(x – (-4))
4	ans: 8x – y + 7 = 0 •1 $m_{QR}=-\frac{1}{8}$ •2 $m_{\perp}=8$ •3 $y-(-1)=8(x-(-1))$
5	ans: CE 3x + y – 5 = 0 BD x – y + 1 = 0 J (1, 2) •1 $E=(2,-1)$ •2 $m_{CE}=-3$ •3 $y-(-1)=-3(x-2)$ *or* $y-8=-3(x-(-1))$ •4 $m_{AC}=-1$ •5 $m_{BD}=-1$ •6 $y-(-2)=1(x-(-3))$ •7 strat: attempt to solve simultaneously •8 $J=(1,2)$
6	**(a)** •1 Calculate the length of the sides •2 $AB=AC=\sqrt{3^2+6^2}$ **(b)** •3 knows to find equ. of an altitude •4 $m_{AC}=-2$ •5 $m_{BE}=\frac{1}{2}$ •6 $y-2=\frac{1}{2}(x-1)$ •7 $x=4$ stated or implied •8 knows how to find intersection •9 $H=\left(4,\frac{7}{2}\right)$ •10 $DA=6$ and $DH=1\frac{1}{2}$

7	(a)	$\bullet^1$ midpoint $= (4,2)$ $\bullet^2$ $m_{MC} = -3$ $\bullet^3$ $y-2=-3(x-4)$ **or** $y-(-7)=-3(x-7)$
	(b)	$\bullet^4$ $m_{BC} = 2$ $\bullet^5$ $m_{\perp} = -\frac{1}{2}$ $\bullet^6$ $y-1=-\frac{1}{2}(x-(-4))$
	(c)	$\bullet^7$ *e.g.* $3x+y=14$ *and* $x+2y=-2$ $\bullet^8$ attempt to eliminate a variable $\bullet^9$ $(6,-4)$
8	(a)	$\bullet^1$ $m_{\mathrm{AB}} = 2$ $\bullet^2$ $m_{\mathrm{BC}} = -\frac{1}{2}$ $\bullet^3$ $m_{\mathrm{AB}} \times m_{\mathrm{BC}} = -1 \Rightarrow m_{\mathrm{AB}} \perp m_{\mathrm{BC}}$
	(b)	$\bullet^4$ $\mathrm{D}=(3,-1)$ ***and*** $\mathrm{E}=(2,-3)$ $\bullet^5$ $m_{\mathrm{AD}} = \frac{1}{3}$ $\bullet^6$ AD: $y+1=\frac{1}{3}(x-3)$ *or equiv.* $\bullet^7$ $m_{\mathrm{BE}} = -\frac{4}{3}$ $\bullet^8$ BE: $y-1=-\frac{4}{3}(x+1)$ *or equiv.* $\bullet^9$ *eg* clear fractions $\bullet^{10}$ *eg* substitute $\bullet^{11}$ $x=1,\ y=-\frac{5}{3}$